

Claims

1. Telecommunications radio system for mobile communication services comprising at least one base station, the base station comprising at least two antennas, the base station being located at a site, the base station covering an area, the area being subdivided into a multitude of sectors by the at least two antennas, wherein the site is a high structure with a height of at least 50m from erection ground, the base station is located on the site at a height of at least 50m from erection ground and the at least two antennas are arranged in a first concentric ring in a first orthogonal plane of the longitudinal axis of the site.
2. Telecommunications radio system according to claim 1 in which the height of the site is in the range of 90m to 320m from erection ground and the base station is located on the site at a height in the range of 90m to 320m from erection ground.
3. Telecommunications radio system according to claims 1-2 in which each sector is served by a separate antenna.
4. Telecommunications radio system according to claims 1-2 in which the multitude of sectors are served by one or more phase-controlled antenna.
5. Telecommunications radio system according to claims 3-4 in which there are at least six sectors.

6. Telecommunications radio system according to claims 3-4 in which there are at least 12 sectors.

7. Telecommunications radio system according to claims 3-4  
5 in which there are at least 24 sectors.

8. Telecommunications radio system according to claims 3-4 in which there are at least 48 sectors.

10 9. Telecommunications radio system according to any of the preceding claims in which one or more antennas are arranged in a second concentric ring in a second orthogonal plane of the longitudinal axis of the site, the second concentric ring having a larger diameter than the first concentric  
15 ring.

10. Telecommunications radio system according to claim 9 in which the first orthogonal plane is the same as the second orthogonal plane.

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11. Telecommunications radio system according to claims 9-10 in which the number of antennas on the second concentric ring is larger than the number of antennas on the first concentric ring.

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12. Telecommunications radio system according to claims 9-11 in which the horizontal angular range of the antennas on the second concentric ring is smaller than the horizontal angular range of the antennas on the first  
30 concentric ring.

13. Telecommunications radio system according to claim 12 in which the vertical aperture angle of the antennas on the

first concentric ring is in the range of 8 to 12 degrees, preferably 10 degrees.

14. Telecommunications radio system according to claims  
5 12-13 in which the vertical aperture angle of the antennas on the second concentric ring is in the range of 3 to 6.5 degrees, preferably 5 degrees.

15. Telecommunications radio system according to claims  
10 11-14 in which the area is being subdivided into 24 sectors by antennas on the first concentric ring and 72 sectors by antennas on the second concentric ring.

16. Telecommunications radio system according to any of the  
15 claims 1-15 in which the shape and/or size of one or more sectors can be changed by switching on or off one or more antennas.

17. Telecommunications radio system according to any of the  
20 claims 1-15 in which the shape and/or size of one or more sectors can be changed by changing the horizontal angular range of one or more antennas.

18. Telecommunications radio system according to any of the  
25 claims 1-15 in which the shape and/or size of one or more sectors can be changed by changing the vertical aperture angle of one or more antennas.

19. Telecommunications radio system according to any of the  
30 preceding claims in which at least one antenna is arranged in a third orthogonal plane of the longitudinal axis of the site to cover an area in the proximity zone of the site,

the third orthogonal plane being located below a height of 50m.

20. Telecommunications radio system according to any of the preceding claims in which the total number of sectors needed to cover the area is calculated as a function of the size of each sector and the required field strength in each sector.
21. Telecommunications radio system according to any of the preceding claims in which all antennas operate at one frequency.
22. Telecommunications radio system according to claim 21 in which a conventional bases station operating at a different frequency is placed within the area for handling local high volumes of traffic.
23. Base station for use in a telecommunications radio system, the base station comprising at least two antennas, the base station being located at a site, the base station covering an area, the area being subdivided into a multitude of sectors by the at least two antennas, wherein
- the site is a high structure with a height of at least 50m from erection ground,
- the base station is located on the site at a height of at least 50m from erection ground and
- the at least two antennas are arranged in a first concentric ring in a first orthogonal plane of the longitudinal axis of the site.

24. Antenna for use in a base station for use in a telecommunications radio system for mobile communication services, the base station being located at a site, the base station covering an area, the area being subdivided  
5 into a multitude of sectors, at least one of the sectors being served by the antenna,  
wherein

the site is a high structure with a height of at least 50m from erection ground,

10 the base station is located on the site at a height of at least 50m from erection ground and  
the antenna and at least one other antenna being arranged in a first concentric ring in a first orthogonal plane of the longitudinal axis of the site.

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25. Mobile network comprising a telecommunications radio system for mobile communication services comprising at least one base station, the base station comprising at least two antennas, the base station being located at a  
20 site, the base station covering an area, the area being subdivided into a multitude of sectors by the at least two antennas,  
wherein

the site is a high structure with a height of at least 50m  
25 from erection ground,

the base station is located on the site at a height of at least 50m from erection ground and

the at least two antennas are arranged in a first concentric ring in a first orthogonal plane of the

30 longitudinal axis of the site.